

Additional chart coverage may be found in CATP2, Catalog of Nautical Charts.

## SECTOR 8 — CHART INFORMATION

## SECTOR 8

### PENTLAND FIRTH

**Plan.**—Pentland Firth is described in this sector. The descriptive sequence is from W to E. The S side of the firth from Dunnet Head to Duncansby Head is described first, then the N side, from Tor Ness to Cantick Head.

#### General Remarks

**8.1** Pentland Firth, 15 miles long, is the strait which separates the Orkney Islands from the N coast of Scotland. The Outer Sound, the main channel, lies between the islands of Stroma and Swona. It is 2.8 miles wide, well marked, and has depths of 54 to 73m. The Inner Sound lies between the island of Stroma and the coast of Scotland. This channel is 1.5 miles wide and has general depths of over 22m.

Pentland Firth is deep and comparatively free of dangers, but navigation within it can be particularly difficult and hazardous at times because of the very strong tidal currents and the resulting unusual conditions. A careful study of the tidal currents should be made before transiting through this passage.

At times, the tidal currents in the Outer Sound attain rates of 7 to 9 knots and those in the Inner Sound attain rates of 4 to 5 knots. The latter channel is naturally preferable when the current is adverse, but it should not be used by large vessels at any time. When the sea is smooth and the wind is light, Pentland Firth is not dangerous. However, vessels can easily get into difficulty because heavy seas are raised when strong winds and swells oppose the strong tidal currents. The rapid change from smooth to rough water and the distinct lines of demarcation between the currents and countercurrents that prevail in the vicinities of the islands and skerries are notable characteristics of this passage. Even large vessels passing from one current area into another may be violently swung around.

Vessels entering Pentland Firth should be prepared for rough weather and extreme caution is necessary in hazy weather. Passage through the strait should not be attempted during fog by low-powered or sailing vessels.

#### Pilotage

**8.2** There are no licensed pilots for Pentland Firth available locally. However, the services of Deep Sea Pilots may be obtained on application to the Forth Pilotage Authority at Leith. Such pilots are normally embarked by prior arrangements in Thurso Bay (See Sector 7). Since such pilots may have to travel considerable distances to the port of embarkation, ample prior notice should be given to the pilotage agency.

Flotta Marine Terminal Pilot Station (58°46'N., 03°07'W.) is situated in the N part of Pentland Firth.

#### Regulations

**8.3** Mariners intending to use Pentland Firth should be aware of very strong tidal currents and sets. Difficulties can be

encountered when transiting either with or against the tide and masters should ensure that a close watch is kept at all times on the course, speed, and position of their vessels.

Masters of laden tankers not bound to or from Flotta and Scapa Flow should not use the Pentland Firth in restricted visibility or adverse weather. At other times, there may be a case for transiting with the tide to reduce the time spent in the Firth, although masters should take into account the general navigation warning above.

Vessels should contact Pentland Coastguard Station by VHF at least 1 hour prior to their ETA at the entrance of the firth and on final departure from the firth. Such vessels should report using the format of the English Channel and Dover Strait Movement Reporting System (MAREP). See Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

**Caution.**—Both eddies and races are formed in several parts of Pentland Firth. At times, some of these eddies are very strong and some of the races are extremely violent. At extreme spring tides, the races may be up to a third greater in strength.

The tidal currents close W of Pentland Skerries have been observed to attain rates up to 16 knots at times. It was reported (1984) that a vessel was unable to make headway in many parts of the firth while making 11 knots through the water.

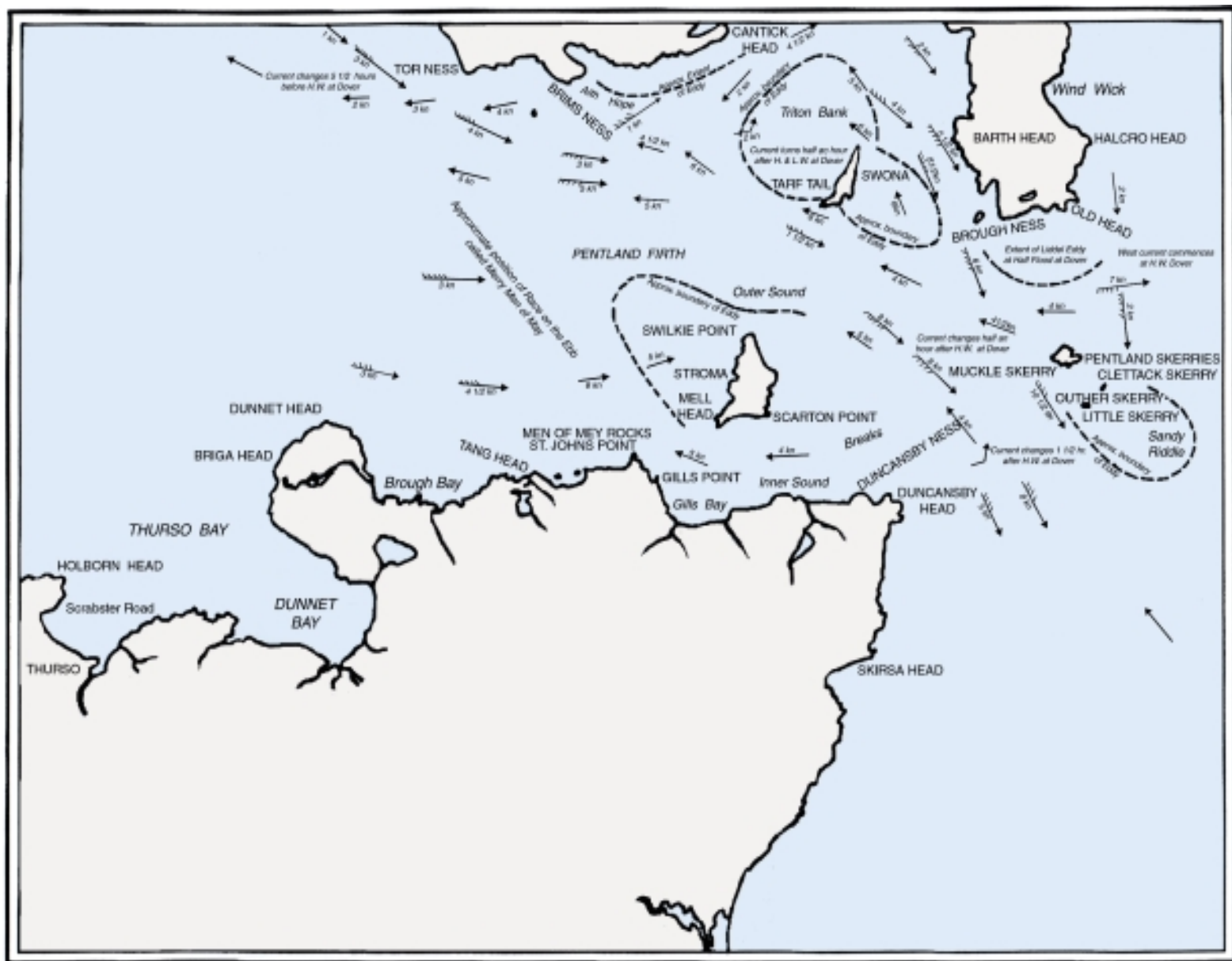
Peculiarities concerning the audibility of fog signals in Pentland Firth have been observed. At times, the fog signals were reported to be less audible when vessels were proceeding toward the signal with the tidal current than proceeding against the current. For vessels approaching Muckle Skerry from the E, the distance at which the fog signal can be heard has been found to be considerably less during the period of the W current than during the E current. In addition, when N of the skerries, an echo of this signal may be heard coming from Little Skerry.

#### Tides—Currents

**8.4** The tidal currents for Pentland Firth are shown as insets on the current charts for the Orkney Islands and are exhibited within Sector 14.

The tide rips, overfalls, countercurrents, and eddies resulting from the very strong tidal currents can seriously impede navigation throughout Pentland Firth. The wide variations in the set and drift of these tidal currents and the variability in the extent of the rips and countercurrents make it difficult to allow for their effects with any degree of accuracy. Within the firth there may be an appreciable difference in the direction and strength of the tidal currents over a comparatively small water area.

**Main currents.**—The main E current sets through the Outer Sound and passes N and S of Pentland Skerries. The S branch sets SE between the skerries and Duncansby Head. The N branch sets NE between South Walls and the island of Swona, partly turning N in Scapa Flow and partly turning S between



CURRENTS IN PENTLAND FIRTH

Swona and South Ronaldsay and rejoining the main current setting through the Outer Sound. The S part of the main E current sets toward the island of Stroma. Close W of this island, it divides, partly setting NE and continuing as the main current and partly turning SE through the Inner Sound and then rejoining the main current off Duncansby Head.

The main W current enters Pentland Firth to the N and S of Pentland Skerries. The S branch sets in a NW direction past Duncansby Head and the main body of the current sets through the Outer Sound. To the W of Pentland Skerries, the N part of the main current branches N and passes between Swona and South Ronaldsay. It then sets W and passes N of Swona to join the current setting S out of Scapa Flow. These combined currents then set SW between Swona and South Walls and merge into the main W current setting through the Outer Sound. The S part of the main W current separates at the island of Stroma. It partly sets through the Outer Sound and partly sets S of the island through the Inner Sound. This latter branch sets NW out of the Inner Sound and then W through the W part of the firth. There is little current at the sides of the channel and both currents begin 3 hours later than in mid-channel. This situation is probably due to the existence of countercurrents.

**Tide rips.**—In Pentland Firth there are two areas where tide rips occur during both the E and W currents, two areas where they occur during the E current only, and one area where they occur during the W current.

The Bore of Duncansby and the Swilkie occur during both the E and W tidal currents; the West Bore of Huna and the Swona Flood Eddy Race occur during the E current; and The Merry Men of Mey occurs during the W current.

The Bore of Duncansby, a tide rip and overfall, is caused by the current running over the foul ground which extends NW from Duncansby Ness. It begins 5 hours 30 minutes before HW at Stromness, while the W current is still running, and extends toward Pentland Skerries. When the E current begins at about 3 hours 15 minutes before HW at Stromness, the area of broken water gradually shifts around to the NW. At about 30 minutes before HW at Stromness, when the E current is strongest, this rip extends beyond the outer extremity of the foul ground.

The Swilkie, a tide rip, occurs off Swilkie Point, the N extremity of Stroma. It is caused by the countercurrents running along the E or W side of the island and meeting with the main current setting through the Outer Sound. Rips and whirlpools, which are very heavy when strong winds oppose the main current, are formed. The Swilkie is present at all times except near slack water.

The West Bore of Huna, a tide rip, occurs when the E current is deflected by the island of Stroma through the Inner Sound and toward Huna Ness. It is dangerous during E and SE gales.

The Swona Flood Eddy Race, an area of broken water, is raised when the general E current passing N of Swona turns SE and meets the N countercurrent setting along the E side of the island. The rips and whirlpools in this area extend SE from North Head, the N extremity of Swona.

The Merry Men of Mey, a tide rip, extends entirely across the W end of Pentland Firth during the strength of the W current. It begins about 2 hours 15 minutes after HW at Stromness and when the current begins to set W through the Inner Sound. During the first hour of the W current, this tide

rip extends W from the Men of Mey Rocks toward Dunnet Head. As the strength of the current increases, the rip gradually trends NW toward Tor Ness, on the opposite and N side of the firth. At the maximum strength of the current, the rip extends clear across the W end of the firth. Even in fine weather, this tidal rip creates an area of heavy and broken sea. During the last 2 hours of the main W current through the firth, the rip becomes detached from the Men of Mey Rocks, leaving a passage between the rocks and the broken sea. During W gales or swells and when the current is strongest, a terrific and violent turbulence is created across the firth. This violent tide rip forms a natural breakwater across the firth and vessels of sufficient power can safely navigate to the E of it in comparatively smooth water. However, the W current setting out of the Outer Sound can be very strong, with rates in excess of 10 knots, and vessels should take care to avoid being swept into the area of the rip.

**Countercurrents.**—During strong tidal currents, a countercurrent is set up behind nearly every salient point as the main current sets past.

In the following descriptions, the term "eddy" is often synonymous with the term "countercurrent."

In Pentland Firth there are seven principal eddies or countercurrents during the E tidal current.

The Brough Bay Eddy is formed by the E current setting past Dunnet Head. It sets N along the land extending between Brough Bay and Dunnet Head during all but about the first 30 minutes of the E current.

The Gills Bay Eddy occurs in Gills Bay and is caused by the E current setting past St. John's Point. It sets N between Gills Bay and St. John's Point for about the last 3 hours of the E tidal current.

The Stroma Flood Eddy, which actually consists of two countercurrents, extends up to 1 mile E from the E side of Stroma. Part of the main current sets around the N and S ends of the island and circles around toward the E side. These countercurrents then follow the coast and rejoin the main current off each end.

The Swona Flood Eddy extends up to about 2 miles SE from the E side of the island of Swona. It is similar to the Stroma Flood Eddy.

The island of Switha lies NE of Cantick Head, the SE extremity of South Walls, and is separated from it by Cantick Sound. The current flowing S out of this sound forces the main E tidal current running along the S side of South Walls away from the land and then sets toward Brims Ness as The Switha Eddy, a countercurrent. The current flowing out of Cantick Sound begins at about HW at Stromness and the countercurrent extends up to about 0.8 mile offshore.

The Liddel Eddy, a countercurrent, flows along the S coast of South Ronaldsay. It is caused by the main E current being forced away from the land by the current setting S along the E side of South Ronaldsay. The latter current begins about 2 hours before HW at Stromness, and as it increases in force, it pushes the main E current offshore and sets W toward Lother Rock. This countercurrent increases in size until about 30 minutes before HW at Stromness when it occupies about half the area between South Ronaldsay and Muckle Skerry. At about 1 hour 30 minutes after HW at Stromness and near the

end of the main tidal current period there is only a very narrow band of E current running close N of Muckle Skerry.

The Pentland Skerries Flood Eddy, a NW countercurrent, forms on the SE side of Pentland Skerries and may extend up to 3 miles SE from Little Skerry and Clettack Skerry. It seldom attains a rate exceeding 1.5 knots.

In Pentland Firth, there are four principal eddies or countercurrents during the W tidal current, as follows:

1. The Pentland Skerries Ebb Eddy forms small countercurrents or eddies to the W of Muckle Skerry and to the NW of Little Skerry and Clettack Skerry.
2. Lothar Rock Eddy, a countercurrent, forms W of Lothar Rock. The main W current curves around this rock and toward the W side of South Ronaldsay.
3. The Swona Ebb Eddy, a countercurrent, is similar to the Swona Flood Eddy, only it occurs on the W side of the island. During the strength of the main W current, it may extend up to about 3 miles NW from the island.
4. The Stroma Ebb Eddy, a countercurrent, may extend as far as the Merry Men of Mey, about 2.5 miles NW of Stroma, during the strength of the W current. It is similar to the Stroma Flood Eddy.

## Pentland Firth—South Side

**8.5 Dunnet Head** ( $58^{\circ}40'N.$ ,  $3^{\circ}22'W.$ ), the N extremity of Britain, is marked by a light and fully described in Sector 7.



*Photo courtesy of Scottish Radiance*  
DUNNET HEAD LIGHT

From Dunnet Head, the coast trends generally SSE for 1.8 miles and then E for 2 miles to form Brough Bay. Except for The Cleits (Cletts) of Brough, two rocky islets lying in the SW corner, this bay is free of offshore dangers. It has depths of 14 to 36m, but the rocky bottom makes anchorage mostly unsuitable.



VIEW OF DUNNET HEAD

Scarfskerry Point is located 3.3 miles ESE of Dunnet Head. It is double-headed, 9m high, and forms the E entrance point of Brough Bay. The coast extending between this point and St. John's Point is fringed by a reef which extends up to 300m offshore. Mey Bay, a small and shallow bight, lies about midway between these points.

**St. John's Point** ( $58^{\circ}40'N.$ ,  $3^{\circ}11'W.$ ) is located about midway between Dunnet Head and Duncansby Head, the NE extremity of Scotland. It is rugged and 15m high. Mey Hill, a prominent hill, is 72m high and rises close S of this point.

The Men of Mey Rocks, a group of partly drying and above-water rocks, is located close N of St. John's Point. The outermost rock of this group lies 0.2 mile offshore.

A shoal bank, with depths of 11 to 18m, lies about 1.6 miles NW of St. John's Point. Another bank, with depths of 24 to 36m, lies about 2.5 miles NNW of the point.

**Gills Bay** ( $58^{\circ}39'N.$ ,  $3^{\circ}09'W.$ ), lying 1.5 miles SE of St. John's Point, is entered between Crees Head and Ness of Quoys, 1.4 miles ESE. Temporary anchorage can be taken in this bay during fine weather, but the rocky and sandy bottom provides poor holding ground. A small pier projects from the head of the bay and it was reported (1990) that a small ferry terminal was under construction in this vicinity.

Ness of Huna, a point off which violent turbulence occasionally occurs, is located 1 mile ENE of Ness of Quoys.

**Ness of Duncansby** ( $58^{\circ}39'N.$ ,  $3^{\circ}03'W.$ ) is located 1.5 miles E of Ness of Huna. It is low, grassy, and fringed by a reef. The famous John o' Groat's Hotel stands on a mound, about 0.5 mile WSW of this point, and is prominent. A small boat harbor, marked by a light, fronts the shore below the hotel. Foul ground extends up to about 1.2 miles NNW of the point and heavy breaking seas occur at the outer end. Temporary anchorage, during fine weather, can be taken in a depth of 13m about 0.3 mile NNE of the hotel. This berth is clear of the strength of the tidal currents, but the holding ground is not good.

**Duncansby Head** ( $58^{\circ}39'N.$ ,  $3^{\circ}01'W.$ ) is located 1 mile ESE of Ness of Duncansby. This point, along with the coast extending S of it, is fully described in Sector 9.

## Pentland Firth—Off-lying Islands

**8.6 Stroma** ( $58^{\circ}41'N.$ ,  $3^{\circ}07'W.$ ) lies on the S side of Pentland Firth. The Inner Sound, 1.5 miles wide, leads between the S side of this island and the mainland of Scotland. The W side of the island consists almost entirely of cliffs which are fringed by below-water and drying rocks. The E side is mostly rocky and flat. Cairn Hill, the summit, is 51m high and rises close NW of Scarton Point, the SE extremity of the



MUCKLE SKERRY

island. A conspicuous church is reported to stand near the center of the island.

Stroma Skerries, marked by a beacon, extend up to about 0.2 mile S from Mell Head, the SW extremity of the island. These drying rocks are steep-to on the W side, but shelf on the S and E sides. A small boat harbor lies 0.7 mile E of Mell Head. Vessels can anchor in a depth of 15m, shells, about 0.2 mile SSW of this harbor. The berth is clear of the main tidal currents, but the countercurrent attains a rate of about 1 knot in this vicinity.

**Swilkie Point** (58°42'N., 3°07'W.) is the N extremity of Stroma. A main light is shown from a prominent tower, 23m high, standing on this point.

It is reported (1993) that a stranded wreck lies close off the SW side of Stroma.

**Swona** (58°45'N., 3°03'W.) lies on the N side of Pentland Firth. The E side of this island is lined by smooth cliffs and is steep-to. The W side is low and fringed with rocks. Detached rocks lie up to 300m seaward off the W and SE sides of the island. Warbister Hill, the summit, is 41m high and rises 0.6 mile ENE of Tarf Tail, the SW extremity of the island. Triton Bank, a rocky shoal area, has a least depth of 32m and lies about 1.3 miles NW of North Head, the N extremity of the island.

A light is shown from a column, 6m high, standing on Tarf Tail and another light is shown from a hut with a pillar, 2m high, standing on North Head.

**8.7 Pentland Skerries** (58°40'N., 2°55'W.) are the group of islets and rocks which lie in the E entrance of Pentland Firth. Channels leading into the firth pass both N and S of this group.

**Muckle Skerry** (58°41'N., 2°55'W.), the largest and N most of the group, is a flat and grassy islet, 18m high. Reefs fringe this islet and Bow, a shallow rock, lies close off its NW side. A main light (Pentland Skerries) is shown from a conspicuous tower, 36m high, standing near the N side of this islet. A lower tower, surmounted by a fog siren, is situated close S of the light.

Little Skerry lies 0.8 mile SSE of Muckle Skerry. This rocky islet is 8m high and rocks extend up to 0.2 mile W from its W end. The channel lying between these islets has depths of 22 to 36m.

Cletlack Skerry, a group of above-water rocks, and Louthier Skerry, an above-water rock fringed by sunken rocks, lie about 0.7 mile and 0.5 mile NE, respectively, of Little Skerry. The narrow passages leading between these dangers are foul.

A rocky bank, about 0.5 mile wide, extends 3.5 miles SE from Little Skerry and has general depths of 12 to 22m. Sandy

Riddle lies on the bank, about 1 mile SE of Little Skerry. This small shoal area has a least depth of 11m and the sea breaks heavily over it during SE gales.

Vessels awaiting the turn of the tidal currents can safely anchor on Sandy Riddle when the sea is smooth.

## Pentland Firth—North Side

**8.8** Pentland Firth is bounded to the N by the S shores of the islands of Hoy, South Walls, and South Ronaldsay.

**Tor Ness** (58°46'N., 3°17'W.), the SW extremity of Hoy, forms the NW entrance point of the firth. It is low, flat, and fringed by drying rocks. A light is shown from a tower, 7m high, standing on this point. Another tower is situated close SE of the light.

The W entrance of Pentland Firth, which is 7 miles wide, lies between Tor Ness and Dunnet Head.

**Brims Ness** (58°46'N., 3°14'W.) is located at the S end of a peninsula which projects 1 mile SE from the S end of Hoy. This point is low, rugged, and fringed by foul ground. High seas, resulting from the strong tidal currents, may be encountered off this point.

**Aith Hope** (58°46'N., 3°14'W.), a small inlet, is entered close E of Brims Ness and is open to the SE. It provides insecure and exposed anchorage to small vessels in depths up to 11m. Long Hope, a mostly shallow and foul inlet, lies between the N side of the island of South Walls and Hoy. A causeway, which separates Aith Hope from Long Hope, connects the W end of South Walls to the S end of Hoy.

**Cantick Head** (58°47'N., 3°08'W.) lies at the SE end of South Walls. This steep-sided point is fronted by cliffs, up to 12m high. A main light is shown from a prominent tower, with dwellings, standing on the point. A lighted beacon, is situated 0.3 mile N of the light and marks the Ruff of Cantick, a reef, which extends NE from the shore.

The coast extending N of Cantick Head is described with the S approach to Scapa Flow in Sector 14.

**Lothar Rock** (58°44'N., 2°59'W.), a drying reef, lies 0.4 mile W of Brough Ness, the SW extremity of the island of South Ronaldsay. A lighted beacon, equipped with a racon, is situated near the SW end of this reef.

Between Brough Ness and Old Head, 1.5 miles E, the S coast of the island is fringed with rocks. A disused coastguard lookout building is situated on Brough Ness and is conspicuous. Old Skerries, a reef with several above-water rocks, extends up to about 0.2 mile E from Old Head. The W coast of South Ronaldsay is described with the S approach to Scapa Flow in Sector 14.





*Photos courtesy of George Gilmour*

CANTICK HEAD LIGHT

**Caution.**—Designated areas to be avoided, the limits of which may best be seen on the chart, lie on the N side of Pentland Firth off the E and W sides of the Orkney Islands. In order to avoid the risk of oil pollution and severe damage to the environment, vessels of more than 5,000 grt carrying oil or other hazardous cargoes in bulk should keep clear of these areas.

Numerous fishing pots, marked by small buoys, may be encountered within 100m of the coasts in the vicinity of the firth.

## Directions

**8.9 Full-powered vessels.**—Large vessels, with sufficient power to stem an unfavorable tide, will experience no difficulty in navigating Pentland Firth. The main channels, which are wide and deep, are mostly free of off-lying dangers.

The Outer Sound, which is marked by aids, is the channel generally used, although the Inner Sound may be used when the tidal currents are unfavorable. At night, vessels should only transit through the Outer Sound.

For vessels approaching the firth from the W, the light shown from Muckle Skerry (Pentland Skerries) bearing about 094° and in range with the light shown from Swilkie Point, at the N end of the island of Stroma, leads through the W entrance of the firth. When about 2.5 miles W of the N end of Stroma,

vessels should adjust course and pass not less than 0.5 mile N of Swilkie Point. After passing Stroma, vessels should gradually bring the light shown from the S end of the island of Swona to bear about 328° astern and in range with the light shown from Cantick Head. This astern alignment leads SSE out of the firth, passing between Duncansby Head and Pentland Skerries. After passing the N end of Stroma, an alternative route leads E out of the firth, between Pentland Skerries and Lother Rock.

For vessels approaching the firth from the SE and proceeding between Pentland Skerries and Duncansby Head, the light shown from Cantick Head and the light shown from the S end of Swona in range and bearing about 328° leads NNW into the firth. When about 3.5 miles SSE of Swona, vessels should adjust course to the W and pass about 1 mile N of Swilkie Point, at the N end of Stroma. They should then proceed out of the firth passing about midway between Tor Point and Dunnet Head.

Vessels approaching the firth from the E or NE may steer W though the channel lying between Pentland Skerries and Lother Rock. They should then adjust course to pass S of Swona and continue W through the Outer Sound out of the firth.

**Low-powered vessels.**—The term low-powered vessels applies to those vessels capable of a speed of no more than 10 knots. Such vessels are advised to employ a deep sea pilot if

they are not familiar with the navigation of the firth or have no local knowledge.

The following directions are given for low-powered vessels which may experience some difficulty in navigating the firth:

1. **Vessels approaching the firth from W with the E current and intending to pass through the Inner Sound.**—Vessels should keep Duncansby Head bearing less than  $110^{\circ}$  and open S of Mell Head, the SW extremity of Stroma. This route, which takes advantage of the current, passes about 1 mile N of St. John's Point. Vessels should then adjust course to stay in mid-channel and pass around the S end of Stroma and then SE out of the firth. Vessels should also keep in mid-channel between Duncansby Head and Pentland Skerries in order to retain the last of the favorable E current.

2. **Vessels approaching the firth from W during the W current, if the sea is not too heavy.**—Vessels should pass N of and as close as conditions allow to Dunnet Head. They should then adjust course and steer to pass about 1 mile off St. John's Point. Vessels that cannot stem the adverse current should keep near to the shore of Brough Bay and within 0.5 mile of the coast until near St. John's Point. Vessels should attempt to arrive off St. John's Point during the last 2 hours of the W tidal current when The Merry Men of Mey tide rip has detached from the Men of Mey Rocks, leaving a wide gap. Having passed St. John's Point, vessels should steer toward Mell Point. When close to this point, they should adjust course and steer around Stroma, keeping to the N side of the sound. Alternately, vessels may steer across the sound and into Gills Bay. They may then proceed along the S side of the sound, but care must be exercised as the mainland shore is fronted by several dangers. By keeping to either side of the Inner Sound, vessels will usually experience slack water or possibly a weak countercurrent while the main W tidal current is still setting in the center of the channel.

3. **Vessels approaching the firth from E during the E current.**—Vessels should keep close to the coast S of and in the vicinity of Duncansby Head. By doing this, vessels will experience comparatively slack water while the main E tidal current sets SE farther to seaward. When close NE of Duncansby Head, vessels should steer in a W direction with Dunnet Head just open N of St. John's Head and bearing not more than  $276^{\circ}$ . This route leads N of the coastal dangers and inside Duncansby Race. After passing Ness of Duncansby, vessels should proceed through the sound, keeping to the S side of the passage. Care must be exercised as Duncansby Head and the mainland shore between Ness of Duncansby and Gills Bay are fronted by several dangers.

If the E current is still setting strongly in the vicinity of St. John's Point, vessels may wait in Gills Bay for slack water. However, vessels should pass this point before The Men of Mey tide rip forms, shortly after the beginning of the W tidal current.

4. **Vessels approaching the firth from E during the E current.**—Vessels should keep close to the coast S of and in

the vicinity of Duncansby Head. By doing this, vessels will experience comparatively slack water while the main E tidal current sets SE farther to seaward. When close NE of Duncansby Head, vessels should steer in a W direction with Dunnet Head just open N of St. John's Head and bearing not more than  $276^{\circ}$ . This route leads N of the coastal dangers and inside Duncansby Race. After passing Ness of Duncansby, vessels should proceed through the sound, keeping to the S side of the passage. Care must be exercised as Duncansby Head and the mainland shore between Ness of Duncansby and Gills Bay are fronted by several dangers.

5. **Vessels approaching the firth from E during the W current.**—Vessels should steer in a NW direction past Duncansby Head and then adjust course to approach the Inner Sound. They should pass through this passage by keeping in the center of the channel and taking advantage of the favorable current. During the W tidal current, the races off Duncansby Head and Ness of Duncansby are negligible. However, The Merry Men of Mey tide rip is active and vessels should pass St. John's Point during the last 2 hours of the current when it has become detached and a gap has formed.

6. **Vessels approaching the firth from NE.**—Vessels may steer W though the channel lying between Pentland Skerries and Lother Rock.

During the W tidal current, vessels should pass Old Head at a distance of about 0.5 mile. They should then proceed away from the S coast of South Ronaldsay by adjusting course toward Duncansby Head. When Swilkie Point, on the N end of Stroma, is bearing more than  $264^{\circ}$ , vessels should adjust course to steer in a W direction through the Outer Sound and then continue W out of the firth. Failure to proceed away from the S side of South Ronaldsay incurs the risk of being set onto Lother Rock or Swona by the NW part of the tidal current.

During the E tidal current, vessels should avoid the tide rip which forms close off Old Head and remain in Liddel Eddy, between the latter point and Brough Ness. In this way, vessels will avoid the risk of being set onto Pentland Skerries by the strong SE part of the tidal current which flows between Swona and South Ronaldsay. At the last of the E current, vessels can adjust course and steer through the Outer Sound. However, such vessels must also anticipate the risk of being swept into The Merry Men of Mey tide rip by the strong W current.

**Caution.**—During bad weather and strong gales, vessels may, rather than transit the firth in unfavorable conditions, find it advantageous to pass through Fair Isle Channel which leads between the Orkney Islands and the Shetland Isles.

Large vessels, maneuvering to embark or disembark pilots, may be encountered in the vicinity of Swona.

The large angles required between the actual heading of vessels and their courses to be made good in order to counteract the strong tidal currents may produce deceptive visual aspects, particularly when vessels are proceeding at slow speeds.